IN THE CLAIMS:

Claims 2, 15 and 28 are currently amended. Claims 3, 4, 9-14 and 20-27 are withdrawn. Claims 1, 5-8, 16-19, 29 and 30 are carried forward, all as follows:

1. (Previously Presented) A connection for sucker rods used in strings in petroleum wells to pump petroleum along production tubing from a down hole pump, comprising:

a pair of sucker rods, each having a pin end with a flat transverse end face and at least an adjacent male threaded section;

a coupler of known length between opposite end faces and having at least two interior female threaded sections receiving the male threaded sections of the pin ends, wherein the pin ends of the sucker rods include coupler end engagement members spaced apart from the end faces of the sucker rods and engageable against the coupler end faces; and

the pin ends of the sucker rods are dimensioned in length relative to the coupler length to provide prestressing compressional loading forces between opposing end faces of the pin ends when the male threaded sections are matingly threaded to preselected penetrations in the coupler past engagement of the coupler end engagement members with the coupler ends.

2. (Currently Amended) A connection as set forth in claim 1 above, wherein the preselected insertion for each pin end is to a chosen displacement beyond insertion of the coupler End engagement members to a ~~the~~ hand tight position ~~plane~~, whereby lengths of the pin end sections from the end faces are prestressed in compression and coextensive lengths of the coupler are prestressed in tension and the mating threads lock under prestress to inhibit relative movement.

3. (Withdrawn) A connection for sucker rods as set forth in claim 1 above, wherein the end faces are flat and are engaged with a torque of at least 450 ft. lbs. for 5/8 inch rod, 1100 ft. lbs. for 1-1/8 inch rod, and 1400 ft. lbs. for 1-1/2 inch rod when the pin ends are engaged in the coupler.

4. (Withdrawn) A connection as set forth in claim 3 above, wherein the torque engagement for a 1 inch slim-hole sucker rod is about at least 950 ft lbs.

5. (Previously Presented) A connection for sucker rods as set forth in claim 1 above, further including a torque washer of a selected axial dimension with flat transverse sides and disposed centrally in the coupler between the pin end faces and engaged on each side by the flat end faces of the pin ends, and wherein the length dimensions of the pin ends relative to the coupler length are selected to account for the presence of the torque washer therebetween to provide prestressing compressional loading forces on the pin ends.

6. (Previously Presented) A connection as set forth in claim 5 above, wherein the torque washer is of different material than the pin ends to prevent galling and has flat end faces, the pin end faces and washer end faces each include peripheral chamfers, and the male threads are rolled or machine cut.

7. (Previously Presented) A connection for sucker rods as set forth in claim 6 above, wherein the pin end faces are flat end finished to ±0.0005 inch flatness and to a selected axial dimension with less than ±0.0005 inch tolerance from the selected dimension.

8. (Previously Presented) A connection for sucker rods as set forth in claim 7 above, wherein the connection further includes anaerobic adhesive between the matingly engaged threaded regions.

9. (Withdrawn) A connection for sucker rods as set forth in claim 1 above, wherein the coupler has spaced apart end walls, the pin ends each include a radially extending

shoulder spaced by a distance from the end face predetermined to engage the adjacent end wall of the coupler with compressive prestress load when the pin end faces are under compression to the selected level.

10. (Withdrawn) A connection for sucker rods as set forth in claim 9 above, wherein the compression prestress at both the pin ends and the pin shoulders is in excess of 10,000 psi but no more than 50,000 psi stress.

11. (Withdrawn) A connection for sucker rods as set forth in claim 10 above, wherein the prestress is in the range of 18,000 to 22,000 psi for 1 inch slim-hole sucker rods at both the end faces and the shoulder region.

12. (Withdrawn) A connection for sucker rods as set forth in claim 11 above, wherein a sucker rod of 5/8 inch to 1 ¼ inch has an end shoulder to pin end face dimension within ±0.0005 inch of a selected dimension, the thread section is rolled thread, the coupler has an end to end length of 4.000 inch ± 0.0005 inch and the connection includes a torque washer of selected axial length between the pin end faces.

13. (Withdrawn) A connection for sucker rods as set forth in claim 1 above, wherein the pin ends each include a second male threaded section spaced axially from the first male threaded section and having a greater radius than the first section, and wherein the coupler includes second female threaded sections spaced and sized to matingly engage the section male sections when both pin ends are inserted.

14. (Withdrawn) A connection for sucker rods as set forth in claim 13 above, wherein the second threaded sections have greater areal contact than the first sections, wherein the connection includes a torque washer between the pin end faces, and wherein for a 7/8 inch rod pin end, the threaded surface areas are about 1.622 in^2 for the second threaded sections and about .8491 in^2 for the first threaded section and the pin end face surface

areas are about .889 in^2 and wherein the pin ends are engaged to a torque level of about 950 ft. pounds.

15. (Currently Amended) A fatigue-resistant combination for interconnection of sucker rods into a sucker rod string for use in pumping petroleum to the surface from a downhole location, by joining each pair of opposing pin ends with a separate coupler, comprising:

a cylindrical coupler having an interior axial bore and a central region with female threaded sections at least on each axial side of the central region;

a torque element of a selected axial length disposed in the central region of the coupler and having transverse end faces;

a pair of pin ends of sucker rods engaged in the axial bore of the coupler from opposite ends thereof; the pin ends having flat end faces and adjacent male thread sections that are each matingly engaged into a female threaded section of the coupler, and including shoulders adjacent the male thread and spaced from the end faces of the pin ends engaging the opposite end faces of the torque element to prestress at least portions of the male thread sections of the pin ends in compression and associated portions of the coupler in tension when the pin ends are engaged in ~~threaded into~~ the coupler to a selected displacement of the shoulders against the coupler ends past a ~~the~~ hand tight position ~~plane~~ at which the shoulders first engage the coupler ends.

16. (Previously Presented) A combination as set forth in claim 15 above, wherein the male and female threads meet predetermined standards for disparity in thread heights, and wherein the prestress conditions lock the differently threaded elements together to

inhibit relative displacement and fatigue failure under repeated cycling and bending stresses.

17. (Previously Presented) A combination as set forth in claim 16 above, wherein the coupler and pin ends are compatible with interconnectability and performance standards but have axial dimensions that are precise within ±0.0005 inches of selected standards, wherein the pin ends have a pin neck between the shoulder surface facing the pin end, wherein the torque element is of a different material than the pin ends to prevent galling, wherein anaerobic adhesive is disposed between the matingly engaging male and female threads, and wherein the pin end face and torque element end faces have peripheral chamfers.

18. (Previously Presented) A connection for sucker rods used in pumping in oil well installations, comprising:

a sleeve coupling with an interior female threaded surface and dimensioned in accordance with interconectability and performance specifications and having end walls of given radial dimension;

a pair of sucker rod pin ends, each threaded into the coupling from a different end, each of the pin ends having a male threaded end portion with an end face transverse to the longitudinal axis of the rod that deviates less than about 0.0005 inches from an end face plane, a transverse shoulder spaced from the end plane by a pre-stress dimension, and an undercut pin neck between the root thread of the male thread and the transverse shoulder, and

a torque disk having parallel planar faces spaced apart by a predetermined axial distance the faces deviating from a plane by less than about 0.0005 inches and the torque disk being of different material than the pin ends,

where the spacings between the pin ends and the shoulders, and the axial distance between torque disk faces area selected such that with thread makeup to an operative tightness the end regions of the coupling are in compression coextensive with the pin neck regions and the coupling is in tension coextensive with the torque disk, and pressure and frictional contact are maintained between the pin ends and torque disk and the end walls of the coupling and the pin shoulders.

19. (Previously Presented) A connection as set forth in claim 18 above, wherein the connection also includes anaerobic adhesive sealing and joining at least the threaded regions, and wherein the coupler length, for a 5/8 inch to 1 1/8 inch coupling, is 4.000 inches ±0.0005 inch and the pin end dimension for a 5/8 inch to 1 1/8 inch coupling is accurate to ±0.0005 inch, and the torque washer length is accurate to ±0.0005 inch and includes an edge chamfer at each end, and wherein the thread pitch diameter varies with sucker rod size and, for a 7/8 inch rod is 1.121 inches +0/-0.20 inches.

20. (Withdrawn) The method of providing a sucker rod connection comprising the steps of:

dimensioning API standard sucker rod pin ends to provide a predetermined spacing between threaded sections and pin end faces transverse to the longitudinal pin axis;

processing API couplers to provide that they are within a selected range of length tolerances more precise than API standards;

preassembling a coupler with one pin end to a chosen engagement past the hand-tight plane;

inserting a second pin end into the coupler and

tightening the second pin end into the coupler with a predetermined circumferential displacement past the hand-tight plane and compression against the said one pin end.

21. (Withdrawn) A method as set forth in claim 20 above, wherein the step of preassembling the coupler and one pin end is effected at a common location such as a processing or inventory point, and wherein completion of the connection is effected at a drill site.

22. (Withdrawn) A method as set forth in claim 20 above, wherein the preassembly and second pin end insertion include the steps of prestressing the pin ends in compression against each other while prestressing the adjacent coupler region and prestressing the pin ends in compression against the coupler ends to limit relative movements and displacements between engaging surfaces within the connection such that the connection has fatigue performance in response to load cycles which is at least several times better than API connections.

23. (Withdrawn) A method as set forth in claim 22 above, further including the step of inserting a torque element within the coupling between the pin ends, the torque element being sized to establish the prestress conditions within the coupler and pin ends when the elements are engaged.

24. (Withdrawn) A method as set forth in claim 23 above, wherein the pin ends have radial shoulders separated by pin necks from the threaded sections and wherein the step of prestressing the pin ends comprises engaging the radial shoulders of the pin ends against the individually associated ends of the couplers.

25. (Withdrawn) A threaded connection for a down hole rod system for driving a down hole rotary or reciprocal pump, comprising:

first and second rods, each having an end threaded male section having a first diameter and an adjacent threaded male section spaced apart therefrom and having a second diameter greater than the first diameter;

and a coupler sleeve engaging the first and second rods in end to end relation, and including first and second female thread sections in each end sized to mate with the male threads on the first and second rods.

26. (Withdrawn) A connection as set forth in claim 25 above, wherein the coupler sleeve includes interior transition sections between the first and second female thread sections and a center interior gap between the smaller diameter female thread sections, and the connection includes a torque washer between and engaging the ends of the first and second rods.

27. (Withdrawn) A connection as set forth in claim 26 above, wherein the axial length of the larger diameter male sections is shorter than the axial length of the end threaded sections on the rods, and wherein the rods and torque washer have planar end faces in engagement, and wherein the axial positions of the threaded male sections are dimensioned relative to the end faces to place the torque washer under compression when the thread engagement is tightened to a selected displacement from a hand tight plane.

28. (Currently Amended) A connection for sucker rods used in pumping installations in oil wells, comprising:

a sleeve coupling with interior counter bores at each end region and with an interior and female threaded surface between said counter bores and dimensioned in accordance with specifications which establish that a string of sucker rods can be interconnected to provide predictable performance, and having end walls of given radial dimension and axial dimension within tolerances of

±0.0005 in. in relation to nominal dimensions within the selected specifications;

a pair of sucker rod pin ends meeting the interconnectability standards, each threaded into the coupling from a different end, each of the pin ends having a male threaded end portion with an end face transverse to the longitudinal axis of the rod that deviates less than about 0.0005 in. from a nominal end face plane, a transverse shoulder spaced from the end face plane by a pre-stress dimension, and an undercut pin neck between the root of the male thread and the transverse shoulder, and

a torque disk having parallel planar faces spaced apart by a predetermined axial distance between torque disk faces selected such that the thread makeup is to an operative penetration in the coupling, the end regions and the coupling are in compression coextensive with the pin neck regions and the center region of said coupling in tension is in tension coextensive with the torque disk, and compressive force and frictional contact are maintained between the pin ends and the end walls of the coupling and the shoulders.

29. (Previously Presented) A sucker rod coupling unit comprising:

a sleeve coupling and two sucker rod pin ends with predetermined dimensional criteria and the pin ends including pin neck areas and adjacent shoulders, and the coupling unit further including a torque disk between the pin ends, and being made up with torque or circumferential displacement methods to establish compressive contact forces between the pin end shoulders and coupling end areas and pin thread end areas and the torque disk, and tension force in the pin neck area and in the mid region of the sleeve coupling;

said induced forces imparting a pre-stress into the made up coupled unit at

a degree calculated as to be higher for each sucker rod size and material than any stresses induced by future operating loads.

30. (Previously Presented) A coupling unit as in claim 29 with dimensions such that when the coupling is made up with either a torque or circumferential displacement method it establishes a pre-stress in the unit that eliminates detrimental relative movement between the three combined parts approaching or at the microstructure level of the materials used in the parts.